

Attachment B-5A

EMSL/EPA/RTP Hi-Vol Filter Flow Rate Acceptance Test for
Quartz Filters for the SSI Samplers

Equipment Needed: SSI Sampler
Mercury Manometer
Roots Meter
Barometer
Variable Voltage Transformer
Thermometer
EPA Standard 7-Hole Resistance Plate

1. Adjust mercury manometer scale to zero and open manometer outlet. --
2. With a standard EPA 7-hole resistance plate in filter holder, turn on motor and allow one minute warm-up.
3. Adjust the variable voltage transformer until the flow rate through the roots meter is 40 cu ft/min (1.13 M³/min). (1 cu ft/min = .028 M³/min.) (Follow steps 5 through 11 to determine flow rate).
4. Turn off motor and remove the 7-hole resistance plate.
5. Place filter to be tested in sample holder, turn on motor, and allow one minute warm-up.
6. Start timing the flow through the roots meter for time period t. (In order that a sufficient volume of air pass through the roots meter, t should be 2 minutes.)
7. Record volume (V_I) indicated on roots meter at beginning of time period t.
8. Record volume (V_F) indicated on roots meter at end of time period t.
9. Record atmospheric pressure (P) in mm of Hg, temperature (T) in °C, and pressure difference (ΔP) indicated on mercury manometer.
10. Turn off motor and remove filter.
11. Calculate the flow rate (F) through the roots meter as follows:

$$F = \frac{(V_F - V_I)}{t} \times \frac{(P - \Delta P)}{(T + 273)} \times \frac{298}{760}$$

12. Repeat Steps 5 through 11; and report F , V_F , V_I , t , P , ΔP , and T for each filter that is tested.
13. After every 10 filters, place the 7-hole resistance plate in the filter holder and measure and record the flow rate. If flow is outside 40 ± 1 cu ft/min ($1.13 \pm .028$ M³/min), adjust the variable voltage transformer until flow rate is between 39 and 41 cu ft/min (1.104 and 1.161 M³/min), and repeat flow rate measurement for the previous 5 filters.